

CLAIMS

1. A chip resistor having low resistance comprising: a resistor element formed of an alloy of high-resistant metal and low-resistant metal into a rectangular solid; and connection terminal electrodes formed at ends of the resistor element; wherein a surface of the resistor element is formed with a plating layer made of pure metal with resistance lower than that of the alloy making the resistor element.
- 10 2. The chip resistor having low resistance according to claim 1, wherein the alloy making the resistor element has a negative temperature coefficient of resistance.
- 15 3. The chip resistor having low resistance according to claim 1, wherein the resistor element is formed with a sectional area reducing portion, the sectional area reducing portion being filled with the plating layer.
- 20 4. The chip resistor having low resistance according to claim 2, wherein the resistor element is formed with a sectional area reducing portion, the sectional area reducing portion being filled with the plating layer.
- 25 5. The chip resistor having low resistance according to any one of claims 1-4, wherein the plating layer on the surface of the resistor element is divided between the connection

terminal electrodes, or is narrowed at least partially between the connection terminal electrodes.

6. The chip resistor having low resistance according to any 5 one of claims 1-4, wherein the connection terminal electrodes are integrally extended from ends of the resistor element toward a lower surface of the resistor element, the plating layer being extended onto a surface of the extended electrodes.

10 7. The chip resistor having low resistance according to claims 5, wherein the connection terminal electrodes are integrally extended from ends of the resistor element toward a lower surface of the resistor element, the plating layer being extended onto a surface of the extended electrodes.

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8. The chip resistor having low resistance according to any one of claims 1-4, wherein metal plates serving as connection terminal electrodes are fixed to ends of the lower surface of the resistor element, and wherein an insulator covers an 20 upper surface of the resistor element with the plating layer, while also covering a portion between the connection terminal electrodes on the lower surface of the resistor element.

9. The chip resistor having low resistance according to claims 25 5, wherein metal plates serving as connection terminal electrodes are fixed to ends of the lower surface of the resistor element, and wherein an insulator covers an upper surface of

the resistor element with the plating layer, while also covering a portion between the connection terminal electrodes on the lower surface of the resistor element.

5 10. The chip resistor having low resistance according to any one of claims 1-4, wherein at least the lower surface of the resistor element except for ends thereof is covered by an insulator, the lower surface of the resistor element being formed with a metal plating layer disposed at the ends
10 non-covered by the insulator, the metal layers serving as the connection terminal electrode of the resistor element.

11. The chip resistor having low resistance according to claims 5, wherein at least the lower surface of the resistor element except for ends thereof is covered by an insulator, the lower surface of the resistor element being formed with a metal plating layer disposed at the ends non-covered by the insulator, the metal layers serving as the connection terminal electrode of the resistor element.

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12. The chip resistor having low resistance according to claims 10, wherein the metal layers formed at the ends of the lower surface have a thickness equal to or larger than a thickness of the insulator covering the lower surface of the resistor
25 element.

13. The chip resistor having low resistance according to claim
11, wherein the metal layers formed at the ends of the lower
surface have a thickness equal to or larger than a thickness
of the insulator covering the lower surface of the resistor
5 element.

14. The chip resistor having low resistance according to claim
10, wherein the upper surface and right and left side surfaces
of the resistor element are covered by an insulator.

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15. The chip resistor having low resistance according to any
one of claims 11-13, wherein the upper surface and right and
left side surfaces of the resistor element are covered by an
insulator.

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16. A method of making a chip resistor having low resistance
comprising the steps of:

preparing a lead frame integrally formed with a plurality
of lead bars for forming resistor elements, the preparation
20 using an alloy plate of high-resistant metal and low-resistant
metal;

forming a pure metal plating layer on a surface of the
resistor element in each bar of the lead frame;

adjusting resistance of the resistor element in each bar
25 of the lead frame; and

cutting the resistor element in each bar off the lead
frame after an insulator for covering the resistor element

is formed.

17. A method of making a chip resistor having low resistance comprising the steps of:

5 preparing a laminated material metal plate by fixing a resistor element alloy plate and a connection terminal electrode metal plate to each other, the alloy plate being made of an alloy composed of high-resistant metal and low-resistant metal and being formed integral with a plurality
10 of resistor elements of a rectangular solid arranged, the connection terminal metal plate being made of a metal having resistance lower than the alloy plate;

removing portions of the connection terminal electrode metal plate so as to leave connection terminal electrodes after
15 a plating layer of pure metal is formed on an upper surface of the resistor element alloy plate in the laminated material metal plate, or forming a plating layer of pure metal on an upper surface of the resistor element alloy plate after portions of the connection terminal electrode metal plate in
20 the laminated material metal plate are removed so as to leave connection terminal electrodes;

25 forming insulators for covering the upper surface of the alloy plate and a part of the lower surface of the connection terminal electrode metal plate other than the connection terminal electrodes; and

cutting the laminated material metal plate into the resistor elements.

18. A method of making a chip resistor having low resistance comprising the steps of:

making a rectangular resistor element from a metal plate;

5 forming a pure metal plating layer on a surface of the resistor element;

forming an insulator for covering at least a lower surface of the resistor element at a portion other than ends thereof; and

10 forming metal plating layers serving as connection terminal electrodes of the resistor element at ends of the lower surface of the resistor element which are non-covered by the insulator.

19. A method of making a chip resistor having low resistance comprising the steps of:

making a rectangular resistor element from a metal plate;

forming a pure metal plating layer on a surface of the resistor element;

20 forming insulators for covering an upper surface, a lower surface, and right and left side surfaces of the resistor element except for ends of the lower surface; and

25 forming metal plating layer serving as connection terminal electrodes of the resistor element at the ends of the lower surface of the resistor element which are non-covered by the insulator.

20. A method of making a chip resistor having low resistance comprising the steps of:

preparing a lead frame integrally formed with a plurality of lead bars for making resistor elements, the preparation
5 using a metal plate;

forming a pure metal plating layer on a surface of the resistor element in each bar of the lead frame;

forming an insulator for covering at least a lower surface of the resistor element in each bar of the lead frame except
10 for ends of the lower surface; and

cutting off the resistor element in each lead bar from the lead frame before metal plating layers serving as connection terminal electrodes of the resistor element are formed at ends of the lower surface of the resistor element
15 which are non-covered by the insulator, or forming metal plating layers serving as connection terminal electrodes of the resistor element in each bar at insulator-non-covering ends of the lower surface of the resistor element before the resistor element is cut off from the lead frame.